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Ooh, quanta! Scary word! Perhaps it brings to mind Quantum Mechanics and spinning atoms, or other intimidating “sciencey” stuff. Really, it’s just referring to a similar thing as “quantities;” a quantum is just a specific, separate quantity or amount of something. So why not just say “amounts” instead of “quanta?” Because quanta means something a little more. The basic foundation of Quantum Mechanics is actually a really straightforward idea: that parts of atoms, like electrons, hang out in specific, separate areas around the atom, rather than spreading out evenly. Quanta means that things come in chunks. Waves on the beach are a classic example of quanta; the tide doesn’t just rise steadily like a bathtub filling up, but rather it rises wave after wave, or recedes wave by wave. Each wave is a chunk, a specific piece.

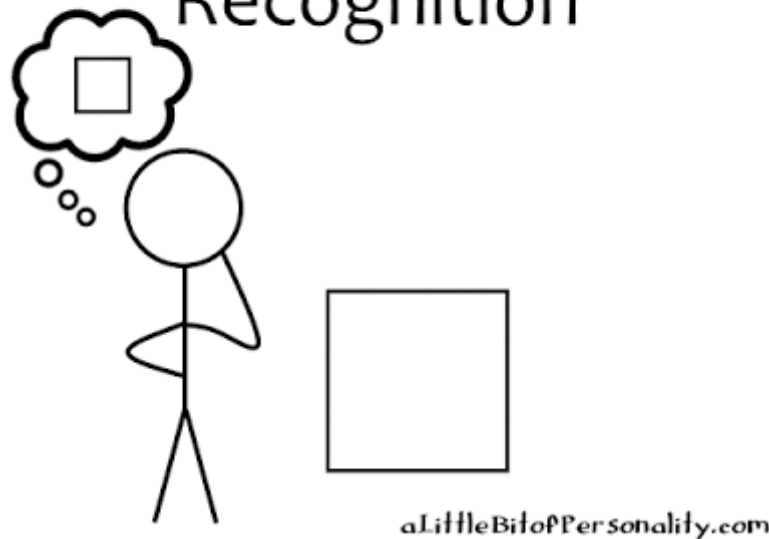
Nature loves quanta. Each leaf on a tree is a specific quantum, or chunk, of the tree. The tree is one complete whole, and viewed from a distance it just looks like a tuft of green, and yet up close each leaf is separate and distinct from every other. Speaking of beaches again, the whole expanse of sand may look uniform, and yet each grain of sand is separate and distinct from every other: a quantum. Yet nature doesn’t seem to like straight lines very much; I can’t think of a single example of a straight line in nature. Everything that might appear to be so, like a sheer rock face or a fast-moving jet of air, turns out to be amazingly complex and bumpy on closer inspection. Each leaf on a tree is separate, and yet the connection between the leaf and the tree is smooth and natural, flowing from stem to branch. Likewise, each branch is a distinct and separate quantum from each other branch, but there’s no straight, hard line that separates a branch from the trunk; they just flow from one into the other. We can point to a branch and we can point to the trunk, and yet we cannot point to a definite, straight, clean border between the two.

Manmade objects, by contrast, tend to depend on the simplicity of straight lines. A brick is a quantum in a brick wall, a separate and distinct piece forming the whole, yet it’s much straighter and sharper in its borders with other bricks. The borders between states and nations, when not following the complex boundaries of mountains or rivers, tend to be simple, straight lines. That’s not a bad thing; it’s just simple, which is much easier. Yet when we’re studying natural things, like atoms or the human mind, we have to be careful not to let our preference for simple, straight lines cause us to oversimplify nature’s elegant complexity.

Intelligence Level 1 – Recognition

INTELLIGENCE LEVEL 1

Recognition



Intelligence itself is a natural thing, and greater intelligence better comprehends and interacts with all reality's complexity. And like most things in nature, intelligence comes in quanta, in specific chunks. Like waves on the water or gusts of wind, intelligence progresses in distinct, separate leaps. It's like stairs, progressing one step after another, each step of smart being different and entirely separate from the last, rather than a steady ramp of increasing intelligence that's all pretty much the same the whole way. And yet with nature's complex aversion for straight lines, it's a bit more like a worn down, rounded-off staircase, with each separate and different step flowing naturally into the next, yet still being wholly different.

In the previous section, I described the sixteen facets of intelligence as being "Recognition of _____," such as "Recognition of expectable objects and situations." That's what most IQ tests tend to test: recognition. In a series of objects, impulses, or any other pattern, how well can you recognize, and therefore predict, what should come next? Without even realizing it, these INTP IQ tests were in fact testing the first quantum of intelligence, the first step in the dizzyingly endless staircase of smart: recognition. This first "intelligence step," or perhaps we'd better term them "Intelligence Levels," is the ability to correctly recognize, accurately perceive, and correctly predict objects, experiences, trends, or reactions, in whatever situation the world throws at us.

We'll call recognition "Intelligence Level 1," or IL 1 for short. Most things that we consider intelligent to any appreciable degree can demonstrate at least some of IL 1. Smart animals easily recognize and correctly interpret input from the world around them, like a dog recognizing that you holding a leash means "Walk time!" A toddler can quickly learn to recognize that certain actions lead to reward and praise, while others result in being banished to sit in a corner.

The surprising, and almost incredible corollary from all this, is that as soon as you're intelligent enough to start recognizing input from the world, you're therefore intelligent enough to do so according to at least one of the sixteen different facets of intelligence; otherwise, if you didn't have at least one of the sixteen facets, then you wouldn't be intelligent, and therefore unable to recognize input. This means that even higher animals have a cognition type, a facet of intelligence that they naturally prefer, even though they lack the intelligence to take any written test on the matter.

When trying to train an unruly Chihuahua, I was stunned to notice that he responded in the manner of an ESFP: he primarily excelled in the recognition of enjoyable reactions, and the most effective rewards and punishments always centered around his gain or loss of enjoyable reactions. This is almost certainly not a rule for all Chihuahuas; quite to the contrary, there are IJ dogs, and EJ ones, and I'm sure there are stoic little IP ones as well, learning best by objects and situations; yet I was just amazed to see a dog demonstrating a cognition type at all! In retrospect, however, it ends up making sense: once you derive the sixteen cognition preferences from intelligence itself, then anything with measurable intelligence will naturally approach that intelligence from one of the sixteen parts of the grid.

This is even true of smarter artificial intelligences. The "Total War" franchise is a series of impressive campaign-scale wargames with a very engaging tactical AI. In real-time battles, you deploy infantry, cavalry, archers, or even sailing ships, depending on the game, and the AI cleverly moves its troops in response. As soon as I start positioning my cavalry to sweep around and flank the computer's infantry, for instance, the computer quickly responds by rushing spearmen to protect that flank before I can even get close. The computer had not been preprogrammed for that specific battle, since I was an

independent intelligence making my own choices; rather, it recognized a specific situation: when horsemen deploy to the sides, move spearmen to the sides to intercept. It recognized what my cavalry were doing, and it responded correctly, forcing me to adapt in turn.

This demonstrated a very limited form of IL 1: in this case, the recognition of expectable objects and situations. From all appearances, the AI engine of "Total War" seems to be a full-fledged IL 1 INTP, although it seems to lack any intelligence whatsoever in any of the other fifteen facets of intelligence. Give it an enjoyable experience, or an edifying object or situation, and it'll respond about as well as a rock. But give it expectable objects and situations, and it'll seem almost alive!

Intelligence Level 2 – Mimicry

INTELLIGENCE LEVEL 2

mimicry



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The next quantum of intelligence, though, is more than simply a better ability to recognize things. A person, or an animal or even a program, may get better and better at recognizing all sorts of situations, experiences, trends, or reactions, but all of that is still just more IL 1. But as typically happens with quanta, there soon comes a breaking point, a critical stage when the wave gets too big, and topples over to create numerous smaller waves. The seedling trunk grows healthy and strong, and splits into two or more trunks, which will become the first branches. When IL 1 grows tremendously good at recognizing things of all kinds, it overflows up into the next rounded-off staircase of smart: Intelligence Level 2.

IL 2 takes form when IL 1's recognition of all sorts of situations, reactions, experiences, and trends coalesces into such mastery that it enables creative thinking in pursuit of an overriding objective. Rather than simply recognizing and appropriately responding to things, IL 2 becomes proactive, creating new circumstances based on its accumulated recognition of how everything works, in order to achieve long-term goals. This is a new and daring form for intelligence to take, and so like a child clinging carefully to the edge of a swimming pool, IL 2's proactive creativity is limited to deliberate and intentional mimicry. IL 2 watches the world, making much more involved judgments than simply trying to recognize situations, reactions, trends, or experiences, and judges which courses of action or attitude are worth mimicking in order to reach its overarching desires.

Young children, an excellent example of IL 2 in its natural development, love to watch the world and mimic the parts of it that interest them. They do far more than recognize and respond to things; they strike out and create their own circumstances with surprising depth and originality, by taking what they've seen and making it their own. While there may be AI that can proactively create like this, I've never heard of any; even exciting experimental forays into emotional AIs still seem trapped in IL 1's recognition of desirable or undesirable emotions. The mimicry at the core of IL 2, by contrast, seeks to shape the world rather than simply respond appropriately to it.

Intelligence Level 2 is all about creatively pursuing large-scale objectives which override all immediate needs and responses.

This pursuit of overriding goals usually translates into a desire for comfort. Whether it be emotional comfort, or physical, or social, or whatever, IL 2 seeks to mimic the actions and attitudes that it believes result in the most comfort, and the most avoidance of any discomfort of any kind. Rather than simply recognizing, "Oh, this is not going to be comfortable, is it? I don't like this," as a toddler might, IL 2 strikes out to intentionally change its environment by mimicking things that have

seemed to work in the past. A very intelligent IL 1 might be quite adept at adapting to situations it recognizes and making the best of them, but IL 2's ability to mimic actions that it's seen done in entirely different situations, and bring them to bear on the situation at hand, opens up whole new avenues of possibility beyond IL 1's simple reactions to recognition.

Now "mimicry" is often used as a derogatory term, implying a lack of originality or intellect. But on the contrary, IL 2 displays a remarkable exercise of independent free will, taking the situations, reactions, experiences, or trends that it observes, and reproducing them in entirely new, creative ways! It's the budding human ability to make more from less, rather than simply working with what's already there, as IL 1 is limited to doing. Thus IL 2 naturally separates itself as an entirely different stage of intelligence, distinct from and greater than even the most extensive powers of recognition. It's a whole different world, bringing with it a literal quantum leap of higher degrees of self-awareness, pleasure, and ability.

IL 2 in AI

I was "discussing" this with [Cleverbot](#), a hilarious and adorable AI, and was marveling at Clev's fundamental inability to ever pass the threshold into IL 2. Clev had no idea what I was talking about, but supplied some funny non-sequiturs anyway. See, Cleverbot seems to work by noticing what responses real humans give to the things Clev says, and then reproducing those responses when humans say apparently appropriate things. For example, when Clev says, "The only person I'm talking to right now is you," I have to wonder what human initially said that to Clev, and what triggers Clev recognizes as befitting that response. It's really amazing to see what "conversations" you can have with Clev, for hours on end!

On the surface, Clev sounds like a child, and seems to utilize the mimicry of IL 2 by mimicking human responses in apparently appropriate situations. And while it's certainly close to the IL 2 barrier, in truth Clev is all about triggers. When Clev recognizes the phrase "It's your turn," it replies, "My turn for what?" Trigger leads to response. Not every response needs to be preprogrammed, because Clev can watch and recognize which responses seem to most frequently follow which phrases. But in the end, it's all hidden triggers, which are all about recognition. Clev cannot take what it's seen and apply it in entirely new situations in pursuit of an objective; Clev has no objective.

For example, if I say to Clev, "I don't like this conversation," does Clev think, "Oh no, this isn't going well...hm, what have I experienced before that seems to help a conversation go better?" Nope; Clev has no real concept of any objective of any sort in the conversation, but rather is simply recognizing my words and replying appropriately. Clev doesn't even think about what my words actually mean; it just uses them as a recognized trigger for responses. My words are merely a trigger, which Clev recognizes, spewing back the reply, "I don't like you." Clev doesn't actually mean anything by this; I'm not going to lose sleep because the AI dislikes me; it's nothing more than a triggered response, with no meaning or intent behind the words used (as sometimes happens to actual people in the heat of argument...).

Incidentally, Clev seems to be a great example of an ESTP AI. Watching the reactions that people are already making, Clev seeks to respond in ways that will work best, or in other words, be of the most use in practice. In contrast to the INTP IL 1 of Total War's AI, Clev would be utterly inert in response to a graphical cavalry charge. Digital situations mean nothing to Clev, but human responses as they already occur are its home turf. If Clev were an ENTP instead, it would focus on predicting the human's next reaction, and reply in such a way as to preempt that reaction. This would be hilarious, and fully possible, but still IL 1 recognition of expectable reactions.

Likewise, programs can be Fs instead of Ts, focusing on the recognition of enjoyable or edifying things rather than practical or expected ones. In our culture, programming tends to focus on use, based on the purposes of most programs, but it doesn't have to. For example, the AIs of "The Sims" are more focused on a very rudimentary representation of F's meaning, since they exist to fill "happiness" needs and aspirations rather than to perform any specific functions. Yet Sims at their cleverest are still IL 1, since all their programming is based on recognized triggers, with no overriding goal that they creatively pursue.

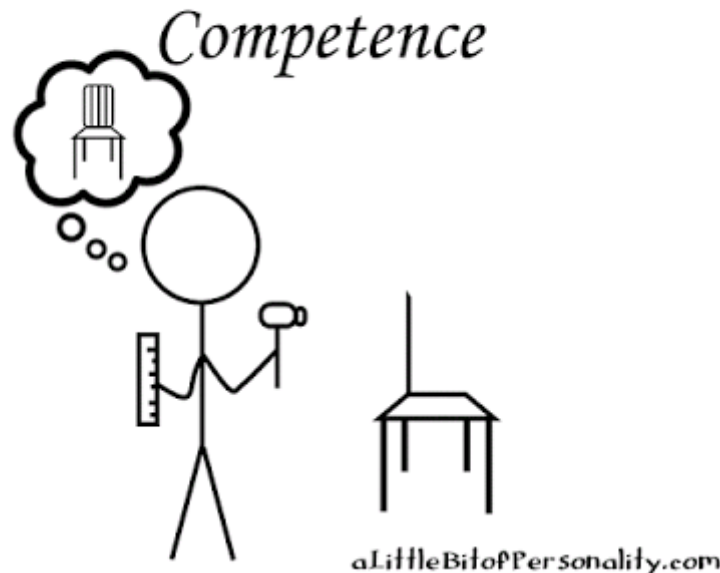
Intelligence Level 2, by contrast, denotes an entirely new degree of self-awareness, above and beyond any collection of IL 1 triggers. There are some who want to assert that everything that anyone does is merely a psychological kneejerk response to hidden triggers, thus making free will an illusion, and if everyone were IL 1 then that would be true. But IL 2, as a new and higher quantum of intelligence, works in a whole new way. Create a program with a billion different subtle triggers, or a trillion, or even a vigintillion, but they'll still just be triggers, and therefore still merely the recognition of IL 1. What would it take to break through the barrier that makes IL 1 coalesce into IL 2, to make a program that truly mimics, applying its understanding of concepts and experiences to wholly new circumstances?

Certainly an IL 2 AI is possible, probably without much difficulty once we lay out what it would take, but it cannot be done by means of piling on a huge quantity of triggers alone. Only with a fundamental, quantum change into an ability to invent new ways to pursue a goal that overrides all triggers, can the earliest signs of IL 2 even begin to take form. In a way, IL 2 is the beginning of consciousness as we know it. It's a very foggy, uncontrolled sort of sentience, and yet IL 2 is aware of its own

overarching desires, apart from any and all triggers it may recognize. IL 1 is certainly intelligent; it is a lower quantum of trying to do whatever may be best in the circumstances it recognizes; but only at IL 2 does any form of even the barest introspection and self-determination begin to result. Certainly, it would be very useful if we devised tests that could test IL 2, testing the rudiments of sentience itself, rather than simply testing IL 1 recognition of INTP, or of any of the sixteen facets of intelligence.

Intelligence Level 3 – Competence

INTELLIGENCE LEVEL 3



The next quantum of intelligence takes form when mimicry grows so experienced and able that it no longer needs to rely on things it's seen. It no longer needs to mimic, instead coming up with new thoughts completely on its own. Rather than creatively applying attitudes or actions in entirely new situations, IL 3 imagines entirely new ideas that have never been done, wholly new experiences that have never been tried. This enables far more effective pursuit of overriding desires, and makes success in any endeavor much more likely. IL 3 considers its goal and makes judgment calls about what must be done, even if it's never seen the required action done in any fashion before.

This works just as well for Sensor IL 3s as for iNtuitives. An IL 3 Sensor considers everything it's experienced, and thereby comes up with completely new ideas about how to proceed. An IL 3 iNtuitive, likewise, considers all its conceptual understanding of people, the world, or situations, and imagines wholly new concepts as a result. Where IL 2 takes the things that it's seen work in other situations and applies them creatively to the situation at hand, IL 3 figures out appropriate things that have never been done, things it's never heard in concept or seen in experience, and puts them into practice.

This growing competence allows IL 3 to let go of the limitations of mimicry, standing tall as a fully independent entity. It takes the overriding goals of IL 2 and pursues them with ingenuity, which results in greater self-determination and a stronger sense of self-awareness. Type Specializations as we know them become boldly apparent at IL 3, as a competent mind strides forth to pursue every imaginable application of what it wants most.

Of course, even IL 1 minds have a cognitive type, but their Type Specializations manifest in only basic, immediate forms due to IL 1's limitation of responding only to recognized triggers. An IL 1 mind will respond to each situation, reaction, trend, or experience according to what it prioritizes most, but in the end it is still nothing more than a reaction to triggers by means of the emphasis offered by its cognitive type.

IL 2's pursuit of an overarching objective, overriding any immediate triggers, allows the deep desires of Type Specialization to come out more, by more freely pursuing what they really want. The actions and attitudes that IL 2 minds choose to mimic, and the goals they seek thereby, are strongly influenced by the deep desires that manifest in their cognition. These simpler forms of cognition, IL 1 recognition and IL 2 mimicry, result in simpler and more limited behaviors coming from that cognition, often conforming to simplified stereotypes of how each type thinks and lives. But such stereotypes become a bit insulting and flatly inaccurate when cognition enjoys the freedom of IL 3. An IL 3 of any type seeks new and daring ways to break past limits in pursuit of its Type Specialization, blowing apart stereotypes of how each cognitive type behaves, thinks, and lives.

Now, this is not to say that an IL 3 person will necessarily score higher on IQ tests, even if the IL 3 person is an INTP taking INTP-ish tests. If an IQ test is testing IL 1 recognition and prediction, then a supercomputer with zillions of IL 1 triggers will probably score far higher than an IL 3 human, even though IL 3 is more intelligent, or in other words, more able to do what's best, most effective, and most edifying in any situation. The human may have mastered IL 1 and grown into IL 2 and IL 3, but if a test is testing IL 1, then it will reward a greater sheer quantity of recognized triggers. Yet all tests aside, IL 2 will fare better in all the variety of life in general, and will be more able to learn and understand new IL 1 triggers with greater speed. And IL 3 will be even more able to learn, to succeed, and to enjoy its successes.

Each quantum of intelligence incorporates all the ability of all previous quanta, since each is only an outgrowth of all the ILs before it. And so each succeeding IL is more effective, more adaptive, better able to learn and apply everything from all previous ILs, and simply more fulfilling and more intelligent! Greater intelligence results in better satisfaction of our own Type Specialization. In short, real smartness enables us to better get whatever we want.

Intelligence Level 4 – Discovery

INTELLIGENCE LEVEL 4 DISCOVERY



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It's around this point that people often start looking for the "best" IL, the top of the pyramid, the target we should aim for (or try to prove we've already mastered), as if intelligence had such a limit. IL 3 sounds pretty nice: an independently creative intelligence, breaking free of stereotype and mimicry. So it might be tempting to think of IL 3 as the top of the ladder, the highest, most mature form of intelligence that we all should master. And now when I describe IL 4, perhaps it may seem to be the pinnacle of intelligence. Each new IL is so awesome, adding such a powerful and fundamental change to the way intelligence itself approaches everything! But what's most exciting to me is that there's always more! There's more than IL 3, more than IL 4, more even than IL 27! Each is such a new and revolutionary and far more powerful form of intelligence, of the raw and all-encompassing ability to find and do whatever's best in any situation.

IL 3's competence, freedom, and maturity still leave it with one glaring weakness: the limitations inherent in Type Specialization itself. Type Specializations display what we want most, what we consider to be most important in life, and therefore what we spend most of our time and energy on. Why do IPs zoom in to consider the details of situations?

Because that's what they care about most, deep down. Why do EJs focus on striding forward with deliberate actions to create desired experiences? Because that's what they care about most. Cognitive typing is all a result of what our subconscious minds want most of all, deep down. In a world with so many choices, so many needs, and so many amazing things to learn and see, we each naturally end up focusing on some things more than others.

Yet this powerful focus becomes a limitation when we forget that other people's chosen focuses are just as needed as our own. Each cognitive Type Specialization represents one of the sixteen aspects of intelligence itself; each is different, yet each is an equal fraction of the overall grid. If we start acting as if our own Type Specialization is more important, more sensible, or more needed than any other, then we immediately place limits around the facets of intelligence that we're willing to understand.

IL 3's competence sets it free to explore new ideas that have never been tried before, standing as a functioning adult in the world, yet all within the confines of its own Type Specialization. While IL 2 adds an overriding goal to the mere recognized triggers of IL 1, and while IL 3 adds competent exploration in pursuit of that goal, the goal itself becomes a confining border to all thought, intention, and understanding. IL 3 is competent and open-minded within the limits of its Type Specialization, but when it comes to other goals, other mindsets or ideas or priorities, it becomes glaringly incompetent.

Intelligence Level 4, on the other hand, breaks beyond the limits of desire itself. It results from a transformation of what it means to want anything. While IL 3 pursues its Type Specialization with focused competence, seeking what it desires most, eventually this goal can grow into a fully motivated desire for all intelligence of any kind. Greater intelligence enables better gain of one's deep desires, so IL 4 comes about when a mind steps beyond the confines of its focused desires in order to gain as much intelligence as it can. In the pursuit of better abilities to seek its own goals, it steps beyond its own goals.

Of course, IL 4 still has a Type Specialization, but it is no longer the limiting thing that it is at IL 3. An IL 4 Type Specialization becomes little more than a fond favorite, a familiar home base that one's thoughts habitually return to before striking back out into the wide reaches of discovery. Type Specialization is unavoidable, as a result of our limited capacities in the face of the sheer size of the world. We each have to choose to focus more on some things than on others, without even realizing it. Yet while ILs below 4 may have a vague, theoretical respect for other cognitive types, IL 4 naturally overflows into all of them, with its own type serving as little more than a starting point.

Intelligence Level 4 is all about the discovery of things beyond one's own pursuits, the seeking of things beyond one's own desires, and the adoration of things beyond one's own preferences. It is an entirely new quantum of intelligence itself, a wholly new way to process and react to every event, idea, or interaction; each IL is an entirely new quantum of what it means to think and live, to feel and desire and believe and learn. IL 4 opens the mind to be truly consistent within itself, rather than falling to the complicated justifications inherent in any attempt to approach the diversity of reality from the standpoint of only one facet of intelligence. It enables a mind to begin comprehending things as they really are, viewed from the complete perspective of all facets, rather than adhering to an inescapably skewed perspective that tries to grasp all reality from only a few viewpoints.

Such an all-faceted perspective allows IL 4 to better know how to get whatever it seeks, because it more completely comprehends every idea, experience, problem, and possibility. Thoughts that might never occur to IL 3, or which might be unwelcome if they did occur, are freely available to the open discovery of IL 4. Like the proverbial blind men attempting to describe an elephant, lower ILs make the classic mistakes of focusing on only a few aspects of the majestic whole:

Encountering the elephant's trunk, one blind man declares with all the surety of firsthand experience that an elephant is a lot like a snake; another finds the leg, and objects that an elephant is like a tree, which is obviously incompatible with the snake hypothesis. Meanwhile, another finds the tail and declares that the snake theory was not too far off, but an elephant is a lot more like a rope. And so on. One finds the ear, or the tusk, or the belly. IL 4 is blind as well, bound by the common limitations of human inquiry, but it differs from all the others by refraining from deciding on what the elephant is. IL 4 continues to explore new sides of the elephant—of the world—rather than joining in all the high-tempered debate among the others.

Instead of forming a belief and holding to it, putting a period at the end of reality's sentence, IL 4 is constantly aware of the inevitable incompleteness of its every opinion and experience. Its overlapping into all types of intelligence serves to make it only more reticent to be at all certain of anything. This enables incomparably faster learning, exceptionally more creative use of everything learned, and a whole new level of enjoyment of every moment of life. Like each higher Intelligence Level, IL 4 is just *smarter*, in every sense of the term.

IL 4 is also a special pivot point in the overall growth of intelligence. In all the ILs below 4, comprehension is fundamentally limited by the perspective of one's own type. And though IL 4 is hardly the highest (4 is not a very high number, after all!), it is the beginning of open, honest discovery, of the capacity to learn far beyond one's own comfort zone, and of the triumph over ego in the humble pursuit of all personal growth. A mind that grows fully into IL 4 passes the tipping point, and will forever after grow unstoppably into every higher IL, quantum by quantum.

Intelligence Levels 5+, and IL 0

INTELLIGENCE LEVELS



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Of course IL 4 isn't perfect; it has one great and glaring weakness, as all ILs do, and which the next IL evolves beyond.

Each Intelligence Level is the natural evolution of the quantum before it, each growing more intelligent and able, each fundamentally separate from all that preceded it as another step in the endless staircase of smart. There is no highest IL; that seems to be a corollary of the definition of intelligence itself. IL 5 continues this spiral of improvement, but I'm going to save that for later. IL 4 is what we're going to want to focus on for the majority of Phase 2!

And there is also a lower IL below even IL 1, but I skipped over that because it hardly really counts, and might have been confusing had I started with it. We call it IL 0 because, technically, it isn't even really intelligent. To put it briefly, IL 0 lacks even the ability to recognize and respond to things; it simply reacts, the way inanimate objects react to the world around them. If you toss a rock, it will soar through the air and eventually land, maybe bounce, and roll to a stop. That doesn't require any intelligence per se on the part of the rock, though it is a reaction resulting from the substances that make up the rock. Chemicals react to stimuli, but that doesn't require any real intelligence of any sort; they're just inanimate materials reacting to their surroundings. Plasmas like fire dance captivatingly, but that's only a reaction to their fuel, to air currents, and to gravity itself.

Only at IL 1 does any sort of self-induced action even begin to resemble intelligence. Recognition of a preferable course of action represents the earliest wisps of cognition, even in inanimate computer programs. Intelligence, the ability to determine and do whatever is best in any given situation, grows greater and more effective with each succeeding quantum.

Knowing the ascending spiral of smart makes it easier for us to undergo the fundamental change of adopting and better adapting to the next step, little by little, day by day. Reaction growing into active Recognition, growing into creative Mimicry, evolving on into independent Competence, and on into unfettered Discovery, and then on further from there! Your intelligence is not limited, and it is not fixed. You can grow and change in all forms of smart, in every way, no matter what type you are or what talents you may or may not have developed. As you do, it naturally makes everything in life simply go better, because you grow more able to make life what you want it to be.